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DEVELOPMENT OF AN INSTRUCTIONAL SYSTEM.

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THE DEVELOPMENT OF AN INSTRUCTIONAL SYSTEM TO IMPROVE CLASSROOM INSTRUCTION IN READING FOR MEXICAN-AMERICAN STUDENTS IS DESCRIBED. AN EVALUATION-REVISION STRATEGY WAS UTILIZED TO INVESTIGATE THE EXTENT OF INTERACTIONS AMONG STUDENTS, MATERIALS, AND THE TEACHER. FOUR ELEMENTARY SCHOOLS IN LOS ANGELES PARTICIPATED IN THIS PROGRAM FOR 1 1/2 YEARS. THE STUDY TRIED TO IDENTIFY DISTINCT PROBLEMS OF FIRST-GRADE MEXICAN-AMERICAN STUDENTS, TO DEVELOP INSTRUCTIONAL PROCEDURES TO OVERCOME THE PROBLEM, AND TO DEVELOP A TOTAL INSTRUCTIONAL SYSTEM. THE FOLLOWING 10 CONCEPT WORDS WERE CHOSEN AS THE PROBLEM AREA FOR THE STUDY--TOP, BOTTOM, ALIKE, DIFFERENT, OVER, UNDER, FIRST, MIDDLE, LAST, AND UNDERLINE. TO DEVELOP INSTRUCTION TO ENABLE MOST MEXICAN-AMERICAN CHILDREN TO LEARN THESE CONCEPT WORDS DURING THE FIRST SEMESTER OF FIRST GRADE, SEVEN TECHNIQUES WERE UTILIZED--TEACHER-LED ORIENTATION, SMALL-GROUP PAIRED HELPERS, STRUCTURED INDIVIDUAL TUTORING, UNSTRUCTURED INDIVIDUAL TUTORING, SMALL-GROUP TUTORING, TEACHER AS TUTOR, AND PARENTS AS TUTORS. THE EVALUATION-REVISION STRATEGY WAS SHOWN TO BE A VALID APPROACH FOR DEVELOPING EFFECTIVE CLASSROOM INSTRUCTION. HOWEVER, THERE ARE SERIOUS PROBLEMS IN THE UTILIZATION OF AN INSTRUCTIONAL SYSTEM AS NOVEL AS THIS ONE, AND MUCH RESEARCH NEEDS TO BE DONE. (JM)

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DEVELOPMENT OF AN INSTRUCTIONAL SYSTEM

This pilot study has been conducted during the past year and a half under a grant from the Ford Foundation. The primary objective was the development of operational procedures for improving classroom instruction in the area of reading for first-grade Mexican-American students. More specifically, the objective was to investigate the extent to which procedures of "shaping" materials for individual learners--that is, the trial-and-revision procedures used in programmed instruction--could be applied successfully to a total classroom configuration in which interactions among students, materials, and the teacher are considered.

There are two major products from the study: first, an illustrative example of effective instruction in a reading skill; and second, a model for obtaining such effective instruction. The second product is of greatest concern. The model is intended to enable educators to answer this question: "Given specific educational objectives, how can an instructional system be developed so that 90% of the students achieve the objectives?"

The study was conducted in four elementary schools in Los Angeles, with the first-grade teachers in the schools participating as integral parts

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of the research team in all aspects of the study. There were three phases to the study: (1) the identification of a reading skill, which presents a distinct problem to first-grade Mexican-American students; (2) the empirical development of instructional procedures to overcome the problem; and (3) the empirical development of a total instructional system, in which instructional procedures and support activities are integrated. The second and third phases were carried out by applying the evaluation-revision strategy that has grown out of work on self-instructional materials.

During the first phase of the study, a reading problem was identified. Participating teachers had suggested some possible problems, and these suggestions were followed up by six weeks of daily observations of reading instruction in Mexican-American and Anglo classrooms. Differences between the two groups were observed for one of the suggested problems, that of the Mexican-American student's lack of knowledge of critical concept words that are part of the vocabulary of reading instruction.

In order to collect more definitive evidence concerning this problem, the two populations were tested on their knowledge of 40 such concept words. The two groups differed on 20 of the words--20 words that the Mexican-American child does not know when he comes to school that his Anglo peer already has learned. After meetings with the participating teachers, 10 of the concept words were chosen as the problem area for the study: top, bottom, alike, different, over, under, first, middle, last,

and underline. Then, the objective of the study was to develop instruction that would enable most Mexican-American students in the first semester of the first grade to master the concepts conveyed by each of the 10 words.

The task during the second phase of the study was the development of appropriate instruction. In any B1 classroom, a few students may know the meanings of all 10 concept words, a small number will not know the meanings of any of the words, and most students will know the meanings of some of the words. Because of this range, and because of the wide individual differences in learning abilities, language abilities, etc., in a Mexican-American classroom, no one method of instruction was found to teach students the meanings of the words. Seven different instructional procedures were found to be useful. In applying the different procedures in the school, it is necessary to give each student the procedures that are most likely to be effective for him. Briefly, they are:

First, Teacher-led Orientation, in which the teacher introduces the concept words in a unit to the entire class. This procedure is very similar to typical primary-grade instruction, with the teacher working with the whole class by lecturing, demonstrating, and asking questions, using objects in the classroom and large charts. This procedure results in little learning; its primary benefit is in terms of orienting the student to the concepts he will learn through other forms of instruction.

Second, Small-Group Paired Helpers, in which first-grade students are paired and work with a booklet and tape recording. Using pretest results

for pairing the students, a student who knows the concepts in a unit helps a classmate who does not yet understand them. Helpers are trained in their roles by their teacher prior to instruction. The instruction in the booklets and recordings was developed to be used with students who are average or better in learning ability and who have a reasonable command of English.

Third, Structured Individual Tutoring, in which an upper elementary student--a fifth- or sixth-grader--tutors a first-grader, following tape-recorded directions and using a booklet. Tutors are given extensive training in their tasks by a school administrator or by a teacher. This procedure was developed for students who are less than average in learning ability, and who have command of common English nouns.

Fourth, Unstructured Individual Tutoring, in which an upper elementary student tutors a first-grader using a variety of approaches and materials. During the training of tutors, the adult trainer identifies those tutors who show particular competency, and these are used for unstructured tutoring. The tutors are given booklets, charts, and classroom objects as vehicles for instruction; they then choose their own methods for working with the younger child. This procedure has been most useful with younger children who have minimal command of English; tutors are encouraged to use Spanish when tutoring, and to slowly blend in the English terms.

Fifth, Small-Group Tutoring, in which an upper elementary student tutors two or three first-graders as a group. The tutor can operate with tape recordings and booklets (structured tutoring) or without the recordings (unstructured tutoring). Again, the most competent tutors are selected to provide small-group tutoring. This procedure is used when not enough trained tutors are available for individual tutoring, or for first graders who need to learn in group settings.

Sixth, Teacher as Tutor, in which the teacher works with from one to four students. The teacher tutors these students using available materials such as booklets, charts, and classroom objects. This procedure is used when students have received other forms of instruction and still experience difficulty with the concepts, or when a student's unique problems require the special capabilities of the teacher.

Seventh, Parents as Tutors, in which an older relative assists a first-grader at home, using booklets and familiar objects in the home. This procedure has been beneficial for students who have not responded to other instruction. To use the procedure, a home-visit consultant helps the parent (or other older relative) to use the booklets and objects at home.

As indicated previously, the seven instructional procedures evolved through extensive experimentation, using the evaluation-revision strategy. Each procedure was tried out and revised a number of times, until certain types of students learned from it.

For the final phase of the study, the seven instructional procedures were integrated into a total instructional system, including the support activities necessary (for example, the selection and training of upper elementary tutors, the identification and training of first-grade helpers, and the administration, scoring and summarization of the pretest and mastery tests).

A first version of the total system was prepared and tried out in two different classrooms. The experimenters conducted these trials, aided by the teachers. Results were most encouraging: more than 90% of the students mastered all 10 concept words.

To verify these results without the direct involvement of the experimenters, the instructional system next was tried out in two classrooms of the participating schools with school personnel responsible entirely for the application of the system. Results of these two trials were promising, but not as much so as had been the experimenter-run trials: about 80% of the students demonstrated mastery of the 10 concepts. Based on information obtained during weekly meetings with the two teachers, the instructional system was revised for the final trials.

For these final trials, two schools were located in another part of Los Angeles, schools that had had no previous involvement in the study. Here, the interest was in determining the extent to which an untrained

staff could apply the instructional system without the experimenters' assistance. With four classrooms involved, more than 90% of the students mastered all 10 concepts.

Three major conclusions can be drawn from this study. First, the evaluation-revision strategy has been shown to be a valid approach to developing effective classroom instruction. By using this strategy, it was possible to develop an instructional system that resulted in students' mastering educational objectives. Further, a model is now available that can be followed by educators interested in developing other instructional systems.

Second, there are serious problems in the utilization of an instructional system as novel as this one. The system is greatly different from the mode of instruction in the typical elementary school; it requires students, teachers, and administrators to play roles quite unlike their usual ones. In addition, existing school resources must be supplemented to carry out all of the elements in the system.

Third, there is much research that needs to be done. Areas for further study include research on the capabilities of school personnel to use the model for obtaining effective instruction; research on how materials producers can use the evaluation-revision strategy in developing instructional materials; and research on means to overcome the quite natural resistance to change and innovation, to encourage schools to use this and other promising innovations.